

What is claimed is:

1. A system for dissipating heat from a high power density device, the system comprising:

- 5 a. a liquid metal chamber placed adjacent to the high power density device;
- b. means for cooling the liquid metal, the cooling means being placed at a predefined distance away from the liquid metal chamber;
- c. at least one conduit passing through the liquid metal chamber and the cooling means in the form of a closed loop, the conduit circulating the liquid metal
- 10 between the liquid metal chamber and the cooling means;
- d. at least one electromagnetic pump for pumping the liquid metal through the conduit,
- wherein heat is transferred away from the high power density device to the cooling means through the liquid metal contained in the conduit, the liquid metal
- 15 being circulated in the conduit by the electromagnetic pump.

2. The system as recited in claim 1 wherein the high power density device is located in a folding electronic device.

20 3. The system as recited in claim 2 wherein the conduit is constructed using a flexible material to allow bending.

4. The system as recited in claim 2 wherein the conduit comprises a flexible portion for transferring the liquid metal across a bend.

25 5. The system as recited in claim 2 further comprising a hinge, the hinge comprising:

 a. an integrated conduit, the integrated conduit allowing transfer of the liquid metal across a bend from at least one conduit to at least one other conduit

6. The system as recited in claim 1 wherein the means for cooling the liquid metal is a heat sink.
7. The system as recited in claim 1 wherein the means for cooling the liquid metal
5 comprises a liquid-heat pipe heat exchanger, a heat pipe and a heat sink.
8. The system as recited in claim 1 wherein the liquid metal chamber is a solid-fluid heat exchanger.
- 10 9. The system as recited in claim 1 wherein the liquid metal chamber is a sealed liquid metal container, the sealed liquid metal container being sealed around the edges of the high power density device, the sealed liquid metal container allowing direct contact between the high power density device and the liquid metal.
- 15 10. The system as recited in claim 1 wherein the high power density device is an integrated circuit.
11. The system as recited in claim 1 wherein the conduit includes a heat pipe.
- 20 12. A system for dissipating heat from a high power density device, the system comprising:
 - a. a heat pipe placed adjacent to the high power density device;
 - b. a liquid-heat pipe heat exchanger, the liquid-heat pipe heat exchanger containing liquid metal, the liquid-heat pipe heat exchanger transferring heat
25 from the heat pipe to the liquid metal;
 - c. means for cooling the liquid metal, the cooling means being placed at a predefined distance away from the liquid-heat pipe heat exchanger; and
 - d. at least one conduit passing through the liquid-heat pipe heat exchanger and the cooling means in the form of a closed loop, the conduit containing the

liquid metal, the conduit circulating the liquid metal between the liquid-heat pipe heat exchanger and the cooling means;
wherein heat is transferred away from the high power density device to the cooling means through the combination of the heat pipe and the conduit.

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13. The system as recited in claim 12 wherein the high power density device is located in a folding electronic device.

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14. The system as recited in claim 12 wherein the conduit is constructed using a flexible material to allow bending.

15. The system as recited in claim 12 a flexible portion for transferring the liquid metal across a bend.

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16. The system as recited in claim 12 wherein the conduit includes a hinge, the hinge permitting rotation between parts of the conduit.

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17. The system as recited in claim 12 wherein the high power density device is an integrated circuit.

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18. A method for dissipating heat from a high power density device, the high power density device placed adjacent to a heat pipe, the method comprising the steps of:

- a. transferring heat from the high power density device to the heat pipe, the heat pipe transporting heat to a predefined distance away from the high power density device;
- b. transferring heat from the heat pipe to a liquid metal system; and
- c. dissipating heat at the liquid metal system.

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19. The method as recited in claim 11 wherein the step of dissipating further comprises the step of transferring heat from the liquid metal loop system to a heat sink.

20. A method for dissipating heat from a high power density device, the high power density device placed adjacent to a sealed liquid metal container containing liquid metal, the sealed liquid metal container allowing direct contact between the high power density device and the liquid metal, the method comprising:

- a. transferring heat from the high power density device to the liquid metal placed in the chamber;
- b. transporting the heated liquid metal away from the chamber through a conduit passing through the chamber;
- c. dissipating heat from the heated liquid metal;
- d. transporting cooled liquid metal back to the sealed liquid metal container.

21. The method as recited in claim 13 wherein the step of dissipating heat from the heated liquid metal further comprises:

- a. transferring heat from the heated liquid metal to a heat pipe;
- b. transferring heat from the heat pipe to a heat sink.

22. The method as recited in claim 13 wherein the step of dissipating heat from the heated liquid metal further comprises:

- a. transferring heat from the heated liquid metal to a heat sink.